

In the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-19. (Cancelled)

20. (Currently amended): An interconnect structure on a semiconductor substrate, comprising:

a via hole in a insulator layer exposing a portion of an underlying lower level metal interconnect structure;

a recessed metal plug structure located in a bottom portion of said via hole, with said recessed metal plug structure overlying and contacting the portion of said lower level metal interconnect structure exposed in said via hole; and

a metal interconnect structure made of a single material layer, the metal interconnect structure comprising:

a metal ring component completely located in a top portion of said via hole, contacting the top surface of said recessed metal plug structure, with said metal ring component continually decreasing in thickness from each side to a center of said via hole; and

a metal interconnect component with a first portion thereof located on a first portion of a smooth top surface of said insulator layer and a second portion thereof, on said via hole, contacting a top surface of said metal ring component;

wherein said second portion of said metal interconnect component ~~has a boundary, between two sides of said via hole, defined by a photo-lithography and etching process~~ extends over only part of the via hole.

21. (Previously Presented) The interconnet structure of claim 20, wherein said lower level metal interconnect structure is comprised of a composite metal structure, featuring an aluminum, or an aluminum based layer, at a thickness between about 2000 to 20000 Angstroms, with an underlying titanium nitride layer, at a thickness between about 100 to 1500 Angstroms, and an overlying titanium nitride layer, at a thickness between about 100 to 1500 Angstroms.

22. (Previously Presented) The interconnet structure of claim 20, wherein said via hole is comprised with a diameter between about 0.10 to 1.0 μ m.

23. (Previously Presented) The interconnet structure of claim 20, wherein said recessed metal plug structure, is comprised of tungsten, with the height of said recessed metal plug structure, located in said bottom portion of said via hole, between about 3000 to 20000 Angstroms.

24. (Previously Presented): The interconnet structure of claim 20, wherein said metal ring component is comprised of aluminum, or aluminum-copper spacers, located on the sides of said top portion of said via hole.